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Dear Sir:

Contract has been awarded by the USAEC to Battelle Institute, Columbus, Ohio, for critical assembly studies of a small heterogeneous boiling water reactor for military applications. Battelle, at its recently completed critical assembly laboratory at Columbus, will attempt to determine the range of usefulness of a control system in which the reflector is used to control the reactor, rather than control rods, as is the more conventional technique. (Other contract awards, BUSINESS NEWS, p. 2 this LETTER.)

Symposium on nuclear metallurgy is planned for the annual Fall meeting of the American Institute of Mining, Metallurgical, and Petroleum Engineers in Cleveland, Oct. 8-10, 1956. George Vineyard, Brookhaven National Laboratory, will present a paper on theory and mechanics of radiation effects on metals; Donald Thomas, Westinghouse Atomic Power Div., Pittsburgh, will discuss irradiation effects in physical metallurgical reactions; and Douglas Billington, Oak Ridge National Laboratory, will cover irradiation effects on reactor materials.

Definite assurance has been given Gunnar Mines that it will be able to sell all its uranium ores for premium prices until Mar. 31, 1962, Gilbert A. LaBine, president, has stated. He said the company has received written advice to that effect from Eldorado Mining & Refining, Ltd., the official Canadian government purchasing agency, and that a formal contract will be awarded the firm shortly. This will be Gunnar's second contract; its first will be fulfilled by 1959 so that the new one will cover production for the remaining three years.

Magnolia Petroleum Co. has now bought another Van de Graaff particle accelerator from High Voltage Engineering Corp., Cambridge, Mass., and plans to use the new machine in its research laboratories in Dallas, Tex. Magnolia, first company to use a particle accelerator in well logging studies, made its first purchase from High Voltage in 1953 when it bought a half-million-volt machine. Its latest purchase will be a 2-million-volt device, for work beyond the capabilities of its smaller unit. (Other PRODUCT, PROCESS news, p. 3 this LETTER.)

It is planned to begin work this month on West Germany's government-sponsored nuclear research station at Karlsruhe, according to Dr. Franz Gurku, the city's director of economic affairs. No decision has yet been reached on where the nuclear reactor for the station will be bought. (Other INTERNATIONAL news, p. 5 this LETTER.)

If proper safeguards are taken, the increased amount of ionizing radiation from large scale atomic energy operations will not cause undue biological hazards, the year-long study of the National Academy of Sciences has concluded. The report, a preliminary one of the NAS's genetics committee, was released last fortnight. (HAZARDS, p. 5 this LETTER.)

Kerr-McGee Oil Industries, Inc., which has substantial uranium interests, showed earnings of $3,405,453 after taxes, for the first three quarters of the current fiscal year, stockholders were recently told. This is the highest figure for any nine months in the company's history. (Other FINANCIAL news, p. 5 this LETTER.)

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ATOMIC ENERGY BUSINESS NEWS...

NUCLEAR POWER PLANT PROGRESS: Improvements in British nuclear reactor power plant design enable greatly increased power production, J.V.N. Dunworth, head of the reactor physics division of the U.K. Atomic Energy told the World Power Conference at Vienna last week. Dr. Dunworth said plants using such improved designs would shortly be ordered from British makers by the Central Electricity Authority as part of the British nuclear power system. Reactors for power systems in the U.S. were also described to the Conference, the Detroit Edison and Consolidated Edison nuclear plants being covered in papers presented, as well as nuclear work underway by North American Aviation's Atomics International division.

The Conference also heard that the Soviet Union will have 2½ million installed kilowatts of nuclear generated electrical power by 1960. (At a recent meeting of the American Nuclear Society, J.A. Lane of Oak Ridge compared this projected Soviet 2½ million KW electrical capacity with the 1.2 million KW electrical capacity Great Britain will have by 1960 and the 0.9 million KW electrical capacity that there will be in the U.S. in 1960--all nuclear reactor generated. Meanwhile, USAEC Commissioner Thomas E. Murray told the Joint Congressional Committee on Atomic Energy last week in Washington that "the present prospect of getting any substantial quantity of industrial atomic power in this country by 1960 is very gloomy--and getting more gloomy every day". The Committee had been holding hearings on the atomic power bill of Sen. Gore to permit the USAEC to build and operate six full-scale atomic power plants at an overall estimated cost of $500 million. The bill is opposed by USAEC Chairman Strauss who said last fortnight that there is no need for the U.S. to engage in a "kilowatt race".)

STANDARD URANIUM WINS CLAIMS CASE:- Standard Uranium Corp., and several others, as defendents, have been awarded title to seventy uranium mining claims in the rich Big Indian district of southeastern Utah, in a decision last fortnight of Federal Judge W. W. Ritter, in Salt Lake City. Plaintiffs, who included Shawano Development Corp., said they intend to appeal the decision. Judge Ritter stated that plaintiffs had failed to convince him they had discovery rights in the property.

URANIUM PROCESSING FACILITY TO BE DOUBLED IN SIZE:- A commercial primary uranium processing plant is planned for Vitro Rare Metals Co's. Canonsburg, Pa., plant. Joseph S. Swigart, general manager, said the present plant would be doubled in size, and that over $1 million will be spent on the expansion which is expected to be completed in about eight months. Technical and reagent grade chemical production will be possible with the new facilities, as well as the milling and processing of uranium, he stated.

THIRD REACTOR LICENSE ISSUED:- Armour Research Foundation has now obtained its license to operate the water boiler type nuclear reactor which was built for it by North American Aviation's Atomics International division, and which it will use for industrial research. Simultaneously with giving Armour this license, the USAEC also permitted Armour to receive and possess 1300 grams of contained uranium-235 in uranyl sulfate solution for use as fuel. This is the third research reactor license issued; others have gone to Pennsylvania State University (July 8, 1955), and North Carolina State College (Oct. 1, 1955).

CONTRACT AWARDS MADE IN NUCLEAR FIELD: Catalytic Construction Co., Philadelphia, has received contract from Union Carbide Nuclear Co., division of Union Carbide & Carbon Corp., for uranium milling facilities. The contract covers the engineering, procurement and construction by Catalytic of a large new uranium processing mill at Rifle, Colo., and two smaller uranium ore processing plants at Slick Rock, Colo., and San Miguel, Utah.

The Dominican Republic has contracted with the Glenn L. Martin Co., Baltimore, for a 12,000 electrical KW pressurized water reactor (and associated generating facilities) to be erected at Ciudad Trujillo. The contract is contingent upon negotiation of the necessary power bilateral, the Martin company stated.

Daystrom, Inc., through its nuclear division in Elizabeth, N.J., is to receive USAEC contract to supply and install the core, process instruments, console and wiring at a cost of $108,363 of the Brookhaven National Laboratory medical reactor. Malan Construction Co., Long Island City, will construct the medical center and reactor building under a $5,141,879 contract.

ATOMIC ENERGY PATENT DIGEST...latest industrial grants...

PRIVATE GRANTS: Process for the recovery of uranium values from waste materials containing silica and metal values, including uranium and chromium. U. S. Pat. No. 2,750,253 issued June 12, 1956 to Fred Smith. (Application filed May 28, 1945.)

Instrument for measuring the average energy per particle of high energy nuclear radiations. U. S. Pat. No. 2,750,513 issued June 12, 1956; assigned to Radio Corp. of America. Inventors: K.W. Robinson, M.W. Green, G.A. Morton. (Application filed Feb. 27, 1953.)

Container for scintillation phosphor utilizing a translucent compliant membrane, U. S. Pat. No. 2,750,514 issued June 12, 1956, assigned to Texaco Development Corp., N.Y. Inventor: F.C. Armistead. (Application filed June 17, 1952.)

Dosimeter for determining the effective dose of penetrative radiation striking a body. U. S. Pat. No. 2,750,515 issued June 12, 1956; assigned to Polaroid Corp., Cambridge, Mass. Inventor: W.A. Shurcliff. (Application filed June 12, 1956.)

Pocket apparatus for integrating measurement of X-rays or radioactive rays, especially hard gamma rays. U. S. Pat. No. 2,750,516 issued June 12, 1956; assigned to Civilforsvarsstyrelsen, Copenhagen, Denmark. Inventor: J.P. Ambrosen. (Application filed June 30, 1952; Denmark, June 30, 1951.)

Apparatus for handling radioactive materials. U. S. Pat. No. 2,750,517 issued June 12, 1956, to Wilhelm M. Baum. (Application filed Dec. 21, 1953.)

GRANTS TO GOVERNMENT AGENCIES: Process for extracting uranium from an ore. U. S. Pat. No. 2,750,254 issued June 12, 1956; assigned to United States of America (USAEC). Inventor: R.A. Blake. (Application filed Nov. 16, 1949.)

Electrostatic device for detecting charges. U. S. Pat. No. 2,750,520 issued June 12, 1956; assigned to United States of America (USAEC). Inventor: A.S. Langsdorf, Jr. (Application filed Mar. 8, 1955.)

NEW PRODUCTS, PROCESSES & INSTRUMENTS...in the nuclear field...

NEW PRODUCTS FROM MANUFACTURERS:- Model DS-3A scintillation well counter for measurement of gamma emitting radioactive samples uses a large sodium iodide well crystal which accommodates a test tube or centrifuge tube containing the radioactive sample. The instrument is designed for normal scintillation counting in conjunction with a scaler or ratemeter, and incorporates a preamplifier so that it may be used with gamma-ray spectrometer systems. --Nuclear Instrument & Chemical Corp., Chicago 10, Ill.

Motor department of this manufacturer is now organized to engineer and manufacture special "canned" heat transfer pump motors for nuclear power systems. A recent 1,250 HP pump and motor unit manufactured here operates inside its sealed casing with internal parts of the motor completely submerged in radioactive coolant water pumped at pressures up to 2,500 lbs/sq. in. and reaching temperatures up to 650 deg. F. --General Electric Co., medium induction motor department, Schenectady, N.Y.

PRODUCTS FOR RESEARCH:- Plutonium-beryllium neutron sources will now be loaned to non-profit educational institutions by the USAEC. Users of the sources (which are for sub-critical assemblies) must obtain a USAEC license, but may obtain these sources without charge.

A 1500 curie source (consisting of radioactive cobalt) has now been installed by Battelle Institute, of Columbus, Ohio, in the radiochemistry laboratory that Battelle operates at Frankfurt, Germany. The source, which was produced by irradiation at the national reactor testing station, Arco, Idaho, was bought by Battelle from the USAEC. Battelle's research center at Geneva, Switzerland will use the Frankfurt gamma-irradiation facility as a supplement to its own radiochemistry labortory.

MANUFACTURERS' LITERATURE:- Bulletin #381 of Nuclear Science & Engineering Corp., Pittsburgh 36, Pa., describes that firm's accelerator-produced isotopes. Many of these isotopes are made available for the first time to industrial and scientific laboratories, and the medical profession. One of these is the long-lived isotope of aluminum..... A revised stable isotopes inventory and price list may be obtained from Oak Ridge National Laboratory, Stable Isotopes Div., Oak Ridge, Tenn. .....Radiochemical catalog and price list may be obtained from New England Nuclear Corp., 575 Albany St., Boston 18, Mass.

PRODUCT SALES (SURPLUS): Sale of contents of building Z, Knolls Atomic Power laboratory, Schenectady, offers liquid metals system, steam system, etc. This is sales invitation No. C-42, bids for which are due July 2, 1956. For information write Material Control, General Electric Co., KAPL, P.O. Box 1072, Schenectady.

THE ROLE OF NUCLEAR POWER IN MEETING OUR ENERGY NEEDS. Special condensation of remarks by W. Kenneth Davis, Director of Reactor Development, USAEC, before National Coal Assoc., June 13, 1956, Washington, D.C.

When a plutonium or uranium atom fissions, a great amount of energy is released. A part takes the form of heat in the fuel material itself. A relatively small additional part of the energy goes off in the form of radiation.

The heat so produced can be best utilized (it now appears) by making steam with it. We know of no practical way at present to get electricity out of nuclear fission without going through a conventional powerplant steam cycle.

Despite attendant difficulties (radiation, engineering problems, etc.), burning fissionable material has several advantages over burning coal, oil or gas. There is compactness: the core for our Pressurized Water Reactor is only 6½-ft. in diameter and height. This compares with the much larger boiler combustion space required for a 100,000 kilowatt generator using conventional fuels.

Another advantage of nuclear fuels over conventional fuels is that a nuclear power plant does not require combustion air, eliminating the flue gas stack. Thus, the 10 or 15% "stack loss" of the conventional powerplant is not found in the nuclear power plant.

A further advantage is the amount of energy which may be obtained from a physically small amount of fuel. On the basis of the material actually fissioned, the amount of heat obtained from one pound of uranium would be equal to that obtained from burning 2,700,000 pounds of coal. This is the kind of performance that might be ultimately obtained in a breeder.

Although it will be a long time until we will find it desirable, necessary or even possible to use granite as a source of fuel, it is of interest that the uranium and thorium occurring in natural granite (assuming 20 parts/million) is sufficient to make each pound of granite potentially the equivalent of 54 pounds of coal. The ultimate resources of fissionable material can thus be seen to be very immense. In fact, the known relatively high grade sources of uranium represent a larger potential source of fuel energy than all the coal reserves of the United States.

Concerning future energy needs: from available data (Paley Commission report, McKinney Panel report. etc.) it is generally predicted that in the next 15 to 20 years the energy demands of the U.S. will be increased 80% over the 1955 demands. The demand for electrical energy is expected to increase about 150% in this period.

Bituminous coal requirements (domestic) are expected to increase from about 420 million tons in 1955 to about 820 million tons for this future period.

Crude oil demands are expected to increase from 7,800,000 bbls./day in 1955 to about 13,300,000 bbls./day at this future period.

What will be the effect of nuclear power on these future fuel requirements?

Several estimates have placed the installed nuclear generating capacity (for the period being considered) in the range of 30,000,000 to 40,000,000 electrical kilowatts. Such plants would replace 80 to 100 million tons of coal per year.

However, even with this large nuclear generating capability, the demand for coal would still be 75% larger than the present capacity of the bituminous coal mining industry. Thus, bituminous coal mining would grow at the same rate as the average U. S. demand for energy. There are also exports of coal to consider, and the fact that coal may have to be used instead of liquid fuels or converted to liquid fuels. If by 1970-75 it is found necessary and economic to supply 5% of the demand for liquid fuels by liquefying coal, the resulting coal requirement would be about 100 million tons per year.

Having reviewed the various factors, it seems rather apparent that the demand for coal will run ahead of the demand for other fuels during the next 15-20 years despite the advent of nuclear power.

What other types of fuel supply might nuclear energy affect? I believe that it will do little to supplant other fuels in most areas during the next 15-20 years.

For example, nuclear energy cannot do much to supply the enormous demand for liquid fuels for automobiles, trucks and aircraft. While it may be useful in ships, it will probably not replace much of the fuel oil predicted for such use in the period under consideration. In space heating, while electrical power from nuclear energy might be used in heat pumps for heating and cooling, this also is unlikely to produce a significant effect on fuel oil demands during this period. In general, the same comments may be made about process heating and other industrial uses.

ATOMIC ENERGY FINANCIAL NEWS...

EXEMPTION FROM HOLDING COMPANY ACT IS PROPOSED:- Parallel actions were taken last fortnight by the Senate Commerce Committee and the Securities and Exchange Commission to exempt temporarily companies that sponsor nuclear reactor projects from Federal regulation under the Public Utility Holding Company Act. The Senate Committee's bill would do what the SEC proposed to do under a new rule. However, the exemption would apply only during the research and development phase of the nuclear project and would not hold once commercial power is produced. (Present SEC rules now require any company owning more than a 10% interest in an electric utility to register with the SEC as a holding company, file periodic financial reports with the Commission, and get SEC approval of certain financial and stock transactions.)

OPTION TAKEN UP BY ATLAS CORP. ON URANIUM CLAIMS:- Atlas Corp.'s wholly owned subsidiary, Hidden Splendor Mining Co., formally took up its option last fortnight on the 33 7/12 interest in the Daniel Ruddock uranium ore body in San Juan County, Utah, owned by Federal Uranium Corp. of Salt Lake City. Consideration involved was $3,350,000. The Atlas affiliate had acquired the option on this ore body from Moore & Schley, New York investment bankers, who had obtained it Nov., 1955, from Federal Uranium in return for an immediate $300,000 one year loan. (Moore & Schley still holds option to buy for $250,000 before June 30, 1956, some 50,000 shares of Federal and 25,000 shares of Federal's 50% owned affiliate, Radorock Resources, Inc.)

NEW ISSUES IN ATOMIC ENERGY FIELD:- New stock offerings include 17,000 shares of Titanium Zirconium Co., offered at 9½ (gross spread of ½) by D. A. Lomasney & Co., 39 Broadway, New York, as underwriter, and 500,000 shares of Hiskey Uranium Corp., offered at 1 (gross spread of 15¢) by Anderson-Hackett Investment Co., Reno, Nev., the underwriter.

LITERATURE AVAILABLE:- A discussion of Green Bay Uranium (now Green Bay Mining & Exploration) may be obtained from De Pontet & Co., 40 Wall St., NYC..... A review of Sabre Pinon Corp., which will result from merger of Sabre Uranium and Pinon Uranium (with the American Metals Co. having a $4,500,000 commitment in the new company) is offered by Mountain States Securities Corp., Denver, Colo.

BIOLOGICAL EFFECTS OF RADIATION...

Two reports issued within the last fortnight were concerned with the ever increasing amount of ionizing radiation to which man is being exposed as world-wide atomic energy applications increase in scope. In the U.S., the conclusion of the year-long study by the National Academy of Sciences was that if proper safeguards are taken, no undue biological hazards will accompany the expansion in atomic energy work. The report recommends that medical and x-ray use be reduced as much as possible. In England, the British Medical Research Council, in a comprehensive report, came to the same conclusion concerning medical use of x-rays, but foresaw greatest danger in the build up in human bone of deposits of radioactive strontium resulting from nuclear weapon detonations. Both reports will be considered by the United Nations committee dealing with atomic matters.

NEW BOOKS & OTHER PUBLICATIONS...on atomic subjects...

Radiation Dosimetry, edited by G. J. Hine and G. L. Brownell. A text dealing with all aspects of radiation dosimetry. 932 pages. --Academic Press, Inc., New York 10. ($22.00)

Atom Harvest, by L. Bertin. A "popular" account of British military and industrial atomic energy work. 253 pages. --Secker & Warburg, Ltd., London, Eng. (20s.)

The H-Bomb & Industry Defense, by V.L. Couch, Fed. Civil Def. Admin. Reprint of paper delivered last week at ASME meeting, Cleveland. --ASME, 29 W. 39 St., NYC. (50¢).

INTERNATIONAL ATOMIC ENERGY NEWS...

WASHINGTON:- The U.S. has now agreed to sell Australia up to 1,100-lbs. of fissionable material during the next ten years, and will assist Australia's atomic energy program, under an agreement signed by the two countries.

GERMANY: Bavaria, W. Germany, has contracted with American Machine & Foundry for AMF's atomic division to supply a swimming pool type reactor for Technische Hochschule Muenchen, the technological institute there.

Sincerely,

The Staff
ATOMIC ENERGY NEWSLETTER

June 26th, 1956